Locating Resources

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Emerging pathogens associated with the use of common household products  
  
  
1. Antibiotics are critical to the treatment of bacterial infections. However, after years of overuse and misuse of these drugs, bacteria have developed antibiotic resistance, which has become a global health crisis (1, 2). The relatively recent increase of surface antibacterial agents or biocides into healthy households may contribute to the resistance problem.  The antibacterial substances added to diverse household cleaning products are similar to antibiotics in many ways. When used correctly, they inhibit bacterial growth. However, their purpose is not to cure disease but to prevent transmission of disease-causing microorganisms to noninfected persons. Like antibiotics, these products can select resistant strains and, therefore, overuse in the home can be expected to propagate resistant microbial variants (3-6). Moreover, these agents, like antibiotics, are not cure-alls but have a designated purpose. Whereas antibiotics are designed to treat bacterial (not viral) infections, antibacterial products protect vulnerable patients from infectious disease-causing organisms. Neither are demonstrably useful in the healthy household.   
  
Author: Stuart B. Levy  
Tufts University School of Medicine, Boston, Massachusetts, USA  
year  2000  
Source: http://www.cdc.gov/ncidod/eid/vol7no3\_supp/levy.htm  
  
2.  More recently, the rapid emergence of resistance to ciprofloxacin indicates that this is the microbes' world, and they are readily adaptable. Because microbes congregate in large numbers to produce infection, generate rapidly, and mutate efficiently, development of resistance is not a matter of "if" but of "when" (Walsh, 2000). The codes for bacterial defenses are carried by DNA either on the chromosome or on extra chromosomal elements called plasmids. These plasmids have the advantage of being able to pass out of the bacteria between cells and species carrying the resistant gene with them.  Bacteria have three basic strategies or DNA programs with which they can adapt and survive antimicrobial assault. These are 1) the efflux pump that propels the antibiotic out of the cell faster than it can flow in, 2) enzymatic deactivation of the antibiotic "warhead" as with the beta-lactamase inactivation of the penicillin family, or 3) changing the target structure in the bacteria so it becomes unrecognizable by the antibiotic (Walsh, 2000).   
  
Author: Locke, Luana J.   
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URL: http://www.allbusiness.com/health-care-social-assistance/ambulatory-health-services/523003-1.html  
  
3. Chlorine products are effective in reducing many of today's infection risks, as is evidenced by their use as disinfectants in healthcare settings for over a century.6 Hypochlorites have broad antimicrobial activity (less effective against spore-forming organisms), good stability and rapid killing action. They are available in liquid form (sodium hypochlorite) or solid form (calcium hypochlorite). Household bleach (aqueous solutions of 5.25% to 6.15%) is quite common for cleaning, and other formulations have been effective for routine disinfection in healthcare organizations (HCOs) and during outbreaks. Because these products do not stain or leave toxic residues and are inexpensive and non-toxic at concentrations that disinfect, they are highly desirable disinfectants in the healthcare setting. The few disadvantages of chlorine products include ocular irritation or burns of the GI  tract and corrosiveness to metals when used in high concentrations.  
  
URL: www.waterandhealth.org/newsletter/preventing3.pdf   
  
4. Although chlorine is the primary disinfectant of choice in water treatment practice, many waterborne pathogens are resistant to chlorine and are often found in finished water. These chlorine-resistant pathogens include viruses, parasites and bacteria that can cause hepatitis, gastroenteritis, cryptosporidiosis and Legionnaires' disease. In the past decade, some water treatment advancements have improved disinfection efficiency. Enhanced coagulation process and rapid sand filtration have been used to effectively remove a significant percent age of Cryptosporidium and Cyclospora. Post-treatment or on-site disinfection are also available to enhance biological safety of drinking water.  
  
For example, the Pittsburgh Water and Sewer Authority studied post-treatment options in an uncovered reservoir to remove Giardia cysts and Cryptosporidium oocysts. How does chlorine carry out its well-known role of making water safe? Upon adding chlorine to water, two chemical species, known together as "free chlorine," are formed. These species, hypochlorous acid (HOCl, electrically neutral) and hypochlorite ion (OCl-, electrically negative), behave very differently. Hypochlorous acid is not only more reactive than the hypochlorite ion, but is also a stronger disinfectant and oxidant. The ratio of hypochlorous acid to hypochlorite ion in water is determined by the pH. At low pH (higher acidity), hypochlorous acid dominates while at high pH hypochlorite ion dominates.   
  
Thus, the speed and efficacy of chlorine disinfection against pathogens may be affected by the pH of the water being treated. Fortunately, bacteria and viruses are relatively easy targets of chlorination over a wide range of pH. However, treatment operators of surface water systems treating raw water contaminated by the parasitic protozoan Giardia may take advantage of the pH-hypochlorous acid relationship and adjust the pH to be effective against Giardia, which is much more resistant to chlorination than either viruses or bacteria.  
  
URL: http://www.freedrinkingwater.com/water\_quality/quality1/1-cl2-resistant-pathogens.htm   
  
5.We examined whether household use of antibacterial cleaning and hygiene products is an emerging risk factor for carriage of antimicrobial drug�resistant bacteria on hands of household members. Households (N = 224) were randomized to use of antibacterial or nonantibacterial cleaning and hygiene products for 1 year. Logistic regression was used to assess the influence of antibacterial product use in homes. Antibacterial product use did not lead to a significant increase in antimicrobial drug resistance after 1 year (odds ratio 1.33, 95% confidence interval 0.74�2.41), nor did it have an effect on bacterial susceptibility to triclosan. However, more extensive and longer term use of triclosan might provide a suitable environment for emergence of resistant species. Further research on this issue is needed.  
 Concern is growing over the use of household cleaning and hygiene products labeled as antibacterial as a result of laboratory data showing a link between exposure to ingredients in these products, particularly triclosan, and emergence of antimicrobial drug resistance (1�3). This study aimed to determine whether home use of antibacterial cleaning and hygiene products (including use of a handwashing soap containing 0.2% triclosan) or other potential risk factors was associated with carriage of antimicrobial drug�resistant bacteria on household members’ hands. We also assessed the association of these antibacterial products with carriage of organisms with reduced susceptibility to triclosan.  
  
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